

WE CLAIM:

1 1. A method of screening a patient for cancer, the
2 method comprising:

3 a) performing an amplification technique on a
4 sample from a biopsy taken from a patient to produce an
5 amplified sample, wherein the patient has been determined
6 to be negative for CIN III, wherein the sample comprises
7 nucleic acid, and wherein the amplification technique is
8 specific for amplification of a portion of an HPV
9 sequence.

1 2. The method of claim 1 wherein the biopsy is obtained
2 by performing the technique of ductal lavage on a breast
3 of a patient.

1 3. The method of claim 1 wherein the patient is a
2 human, wherein the cancer is in any stage of development,
3 and wherein the cancer is selected from the group

4 consisting of breast, dermal, oral, penile, vulvar
5 cancer, and any combination thereof.

1 4. The method of claim 1 wherein the amplification
2 technique is polymerase chain reaction amplification.

1 5. The method of claim 1 wherein the amplification
2 technique is reverse-transcription polymerase chain
3 reaction amplification.

1 6. The method of claim 1 wherein the amplification
2 technique is specific for amplification of a portion of
3 a HPV sequence selected from the group consisting of
4 HPV18, HPV31, HPV 33, HPV35, HPV45, HPV58.

1 7. The method of claim 1 wherein the amplification
2 technique is specific for amplification of a portion of
3 at least two HPV sequences selected from the group
4 consisting of HPV18, HPV31, HPV 33, HPV35, HPV45, HPV58.

1 8. The method of claim 7 wherein one of the at least
2 two HPV sequences is HPV18.

1 9. The method of claim 1 wherein the amplification
2 technique is specific for amplification of a portion of
3 HPV16 and at least one HPV sequence selected from the
4 group consisting of HPV18, HPV31, HPV 33, HPV35, HPV45,
5 HPV58.

1 10. A method of screening a patient for cancer, the
2 method comprising:

3 a) performing an amplification technique on a
4 sample from a biopsy taken from a patient to produce an
5 amplified sample, wherein the sample comprises nucleic
6 acid, and wherein the amplification technique is specific
7 for amplification of a portion of a HPV sequence selected
8 from the group consisting of HPV18, HPV31, HPV 33, HPV35,
9 HPV45, HPV58.

1 11. The method of claim 9 wherein the amplification
2 technique is specific for amplification of a portion of
3 at least two HPV sequences selected from the group
4 consisting of HPV18, HPV31, HPV 33, HPV35, HPV45, HPV58.

1 12. The method of claim 9 wherein the patient is a
2 human, wherein the cancer is in any stage of development,
3 and wherein the cancer is selected from the group
4 consisting of breast, dermal, oral, penile, vulvar
5 cancer, and any combination thereof.

1 13. The method of claim 9 wherein the biopsy is obtained
2 by performing the technique of ductal lavage on a breast
3 of a patient.

1 14. The method of claim 9 wherein the amplification
2 technique is polymerase chain reaction amplification.

1 15. The method of claim 9 wherein the amplification
2 technique is reverse-transcription polymerase chain
3 reaction amplification.

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1 16. A method of screening a patient for cancer, the
2 method comprising:

3 a) performing an amplification technique on a
4 sample from a biopsy taken from a patient to produce an
5 amplified sample, wherein the sample comprises nucleic
6 acid, and wherein the amplification technique is specific
7 for amplification of a portion of a HPV16 sequence, and
8 at least one HPV sequence selected from the group
9 consisting of HPV18, HPV31, HPV 33, HPV35, HPV45, HPV58.

1 17. The method of claim 16 wherein the patient is a
2 human, wherein the cancer is in any stage of development,
3 and wherein the cancer is selected from the group
4 consisting of breast, dermal, oral, penile, vulvar
5 cancer, and any combination thereof.

1 18. The method of claim 16 wherein the biopsy is
2 obtained by performing the technique of ductal lavage on
3 a breast of a patient.

1 19. The method of claim 16 wherein the amplification
2 technique is polymerase chain reaction amplification.

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0 1 20. The method of claim 16 wherein the amplification
1 technique is reverse-transcription polymerase chain
2 reaction amplification.
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0 1 21. A method of screening a patient for a cancer, the
0 method comprising:
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0 3 a) contacting cellular material with an HPV
0 4 specific probe, wherein the cellular material is
0 5 extracted from a biopsy taken from a patient, and wherein
0 6 the patient has been determined to test negative for CIN
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III.

1 22. The method of claim 21 wherein the cellular material
2 is derived from cells obtained by performing the
3 technique of ductal lavage on a breast of a patient.

1 23. The method of claim 21 wherein the cellular material
2 comprises nucleic acid, polypeptides, or a combination
3 thereof.

1 24. The method of claim 21 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to the
3 plus strand of an HPV DNA sequence.

1 25. The method of claim 21 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to a
3 portion of an HPV mRNA sequence.

1 26. The method of claim 21 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to a
3 portion of an HPV ribosomal RNA sequence.

1 27. The method of claim 21 wherein the probe is an
2 antibody specific to an epitope of an HPV protein.

1 28. The method of claim 27 wherein the protein is HPV16
2 E6 or HPV16 E7.

1 29. The method of claim 21 wherein the HPV is selected
2 from the group consisting of HPV18, HPV31, HPV 33, HPV35,
3 HPV45, HPV58.

1 30. The method of claim 21 wherein step a) further
2 comprises contacting the cellular material with a second
3 HPV specific probe, wherein the first and second HPV are
4 different from one another and are selected from the
5 group consisting of HPV18, HPV31, HPV 33, HPV35, HPV45,
6 HPV58.

1 31. The method of claim 21 wherein step a) further
2 comprises contacting the cellular material with a second
3 HPV specific probe, wherein the first HPV specific probe

4 is specific to HPV 16 and the second HPV specific probe
5 is specific to at least one HPV selected from the group
6 consisting of HPV18, HPV31, HPV 33, HPV35, HPV45, HPV58.

1 32. The method of claim 21 wherein the cancer is in any
2 stage of development, and wherein the cancer is selected
3 from the group consisting of breast, dermal, oral,
4 penile, vulvar cancer, and any combination thereof.

1 33. A method of screening a patient for a cancer, the
2 method comprising:

3 a) contacting cellular material with a probe
4 specific to a first HPV, and a second probe specific to
5 a second HPV, wherein the cellular material is extracted
6 from a biopsy taken from a patient and wherein the first
7 HPV is HPV 16, and the second HPV is selected from the
8 group consisting of HPV18, HPV31, HPV 33, HPV35, HPV45,
9 HPV58.

1 34. The method of claim 33 wherein the cellular material
2 is derived from cells obtained by performing the
3 technique of ductal lavage on a breast of a patient.

1 35. The method of claim 33 wherein the cellular material
2 comprises nucleic acid, polypeptides, or a combination
3 thereof.

1 36. The method of claim 33 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to the
3 plus strand of an HPV DNA sequence.

1 37. The method of claim 33 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to a
3 portion of an HPV mRNA sequence.

1 38. The method of claim 33 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to a
3 portion of an HPV ribosomal RNA sequence.

1 39. The method of claim 33 wherein the probe is an
2 antibody specific to an epitope of an HPV protein.

1 40. The method of claim 36 wherein the protein is HPV16
2 E6 or HPV16 E7.

1 41. The method of claim 33 wherein the cancer is in any
2 stage of development, and wherein the cancer is selected
3 from the group consisting of breast, dermal, oral,
4 penile, vulvar cancer, and any combination thereof.

1 42. A method of screening a patient for a cancer, the
2 method comprising:
3 a) contacting cellular material with a probe
4 specific to a HPV selected from the group consisting of
5 HPV18, HPV31, HPV 33, HPV35, HPV45, HPV58, wherein the
6 cellular material is extracted from a biopsy taken from
7 a patient.

1 43. The method of claim 37 wherein step a) further
2 comprises a second probe specific to a second HPV
3 selected from the group consisting of HPV18, HPV31, HPV
4 33, HPV35, HPV45, HPV58, wherein the first and second HPV
5 are different from one another.

1 44. The method of claim 42 wherein the cellular material
2 is derived from cells obtained by performing the
3 technique of ductal lavage on a patient.

1 45. The method of claim 42 wherein the cellular material
2 comprises nucleic acid, polypeptides, or a combination
3 thereof.

1 46. The method of claim 42 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to the
3 plus strand of an HPV DNA sequence.

1 47. The method of claim 42 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to a
3 portion of an HPV mRNA sequence.

1 48. The method of claim 42 wherein the probe is an HPV
2 DNA or RNA oligonucleotide sequence complementary to a
3 portion of an HPV ribosomal RNA sequence.

1 49. The method of claim 42 wherein the probe is an
2 antibody specific to an epitope of an HPV protein.

1 50. The method of claim 42 wherein the cancer is in any
2 stage of development, and wherein the cancer is selected
3 from the group consisting of breast, dermal, oral,
4 penile, vulvar cancer, and any combination thereof.

1 51. A method of treating a patient comprising:
2 a) administering a composition comprising an
3 effective amount of an antisense HPV sequence to a
4 patient.

1 52. The method of claim 51 wherein administering
2 comprises delivery of the composition into a milk duct of
3 a breast of the patient by insertion of a microcatheter
4 into a nipple surface orifice of said breast.

1 53. The method of claim 51 wherein the HPV is selected
2 from the group consisting of HPV16, HPV18, HPV31, HPV 33,
3 HPV35, HPV45, HPV58, and any combination thereof.

1 54. The method of claim 51 wherein the antisense HPV
2 sequence is expressed from a viral expression vector.

1 55. The method of claim 51 wherein the patient is human
2 and has a cancer in any stage of development.

1 56. The method of claim 51 wherein the cancer is breast,
2 dermal, oral, penile, or vulvar cancer, or any
3 combination thereof.

1 57. A method of treating a patient comprising:

2 a) administering an effective amount of a
3 composition to a patient, wherein the composition
4 comprises an agent that inhibits expression of at least
5 one HPV gene.

1 58. The method of claim 57 wherein administering
2 comprises delivery of the composition into a milk duct of
3 a breast of the patient by insertion of a microcatheter
4 into a nipple surface orifice of said breast.

1 59. The method of claim 57 wherein the agent is an
2 oligonucleotide comprising antisense HPV DNA, RNA or
3 ribosomal RNA.

1 60. The method of claim 57 wherein the agent is an
2 oligonucleotide comprising sequences complementary to the
3 plus or minus strand of HPV DNA.

1 61. The method of claim 57 wherein the HPV is selected
2 from the group consisting of HPV16, HPV18, HPV31, HPV33,
3 HPV35, HPV45, HPV58, and any combination thereof.

1 62. The method of claim 57 wherein the patient is human
2 and has a cancer in any stage of development.

1 63. The method of claim 57 wherein the cancer is breast,
2 dermal, oral, penile, or vulvar cancer, or any
3 combination thereof.

1 64. A method of treating a patient comprising:
2 a) administering an effective amount of a
3 composition comprising an agent that specifically
4 inhibits the HPV16 E6 protein or the HPV16 E7 protein.

1 65. The method of claim 64 wherein administering
2 comprises delivery of the composition into a milk duct of
3 a breast of the patient by insertion of a microcatheter
4 into a nipple surface orifice of said breast.

1 66. The method of claim 64 wherein the agent is an
2 antibody specific for the HPV16 E6 protein or HPV16 E7
3 protein.

1 67. The method of claim 64 wherein the patient is human
2 and has a cancer in any stage of development.

1 68. The method of claim 64 wherein the cancer is breast,
2 dermal, oral, penile, or vulvar cancer, or any
3 combination thereof.

1 69. A method of treating a patient comprising:
2 a) transfecting dendritic precursor cells of a
3 patient with a recombinant viral vector that drives
4 expression of an HPV antigen;
5 b) treating the dendritic precursor cells with a
6 cytokine to produce dendritic cells stably expressing the
7 HPV antigen;
8 c) contacting T cells together with the dendritic
9 cells stably expressing the HPV antigen to produce primed
10 T cells; and
11 d) administering to the patient an effective
12 amount of either the primed T cells, dendritic cells, or
13 a combination thereof.

1 70. The method of claim 69 wherein the cytokine is
2 selected from the group consisting of interleukins, GM-
3 CSF, TNF, and any combination thereof.

1 71. The method of claim 69 wherein the patient is human,
2 and wherein the patient has a cancer in any stage of
3 development.

1 72. The method of claim 71 wherein the cancer is breast,
2 dermal, oral, penile, or vulvar cancer, or any
3 combination thereof.

1 73. The method of claim 69 wherein the recombinant viral
2 vector is an adeno-associated viral vector.

1 74. The method of claim 69 wherein the HPV is selected
2 from the group consisting of HPV16, HPV18, HPV31, HPV 33,
3 HPV35, HPV45, HPV58, and any combination thereof.

4 75. The method of claim 69 wherein the HPV antigen is
5 HPV E6 or HPV E7.

1 76. A kit for screening a patient for a cancer, the kit
2 comprising:

3 a) a probe specific for detection of an HPV.

1 77. The kit of claim 77 wherein the probe is a single-
2 stranded oligonucleotide sequence, a double-stranded
3 oligonucleotide sequence, a polypeptide, or any
4 combination thereof.

1 78. The kit of claim 77 wherein the HPV is selected from
2 the group consisting of HPV16, HPV18, HPV31, HPV35,
3 HPV45, HPV58, and any combination thereof.

1 79. The kit of claim 77 wherein the patient is human,
2 wherein the cancer is in any stage of development, and
3 wherein the cancer is selected from the group consisting
4 of breast, dermal, oral, penile, vulvar cancer, and any
5 combination thereof.

1 80. A composition for treating a patient having a
2 cancer, the composition comprising:

3 an effective amount of an HPV sequence.

1 81. The composition of claim 80 wherein the sequence is
2 selected from the group consisting of single-stranded
3 nucleic acids, double-stranded nucleic acids,
4 polypeptides, and any combination thereof.

1 82. The composition of claim 80 wherein the HPV sequence
2 is selected from the group consisting of HPV 16, HPV 18,
3 HPV 31, HPV 33, HPV 35, HPV 45, HPV58, and any
4 combinations thereof.

1 83. The composition of claim 80 wherein the HPV sequence
2 is HPV16 and any one of the group consisting of HPV 18,
3 HPV 31, HPV 33, HPV 35, HPV 45, HPV58, and any
4 combinations thereof.

1 84. The composition of claim 80 wherein the HPV sequence
2 is HPV 18 and any one of the group consisting of HPV 16,
3 HPV 31, HPV 33, HPV 35, HPV 45, HPV58, and any
4 combinations thereof.

1 85. The composition of claim 80 wherein the HPV sequence
2 is a combination of HPV 16 and HPV 18.

1 86. The composition of claim 80 wherein the HPV sequence
2 is a combination of HPV 16 and HPV 18 and at least any
3 one of the group consisting of HPV 31, HPV 33, HPV 35,
4 HPV 45, HPV58, and any combinations thereof.

1 87. The composition of claim 80 wherein the HPV sequence
2 is a combination of HPV 16, HPV 18 and HPV 33, and at
3 least any one of the group consisting of HPV 31, HPV 35,
4 HPV 45, HPV58, and any combinations thereof.

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